case of platinum. The silver behaved the same as gold, the metal deposited freely, and the vacuum was easily kept at a dark space of six millimetres by the very occasional admission of a trace of air. In twenty hours nearly three grains of silver were volatilized. The deposit of silver was detached without difficulty from the glass in the form of bright foil.

THE METEOROLOGICAL RESULTS OF THE "CHALLENGER" EXPEDITION.[1]

SEEING that water covers nearly three-fourths of the surface of the globe, and exercises an important influence on the temperature of the air above it, and, by the intervention of winds, extends that influence over the land surfaces, it was impossible to give a satisfactory account of the meteorology of the earth in the absence of records of a complete series of observations taken in the open ocean. It was, therefore, of the utmost importance that the records of the "Challenger" expedition should be thoroughly digested, and this work Dr. Buchan, after seven years' labor, brought to a conclusion rather more than a year ago. In addition to the results of the "Challenger" observations, he also made use of records of temperature, atmospheric pressure, etc., received from a large number of stations in all parts of the world. Some of the most striking points in the report are given in an address to the Royal Geographical Society, published in the Proceedings for March and accompanied by four maps, of which two show the distribution of temperature and atmospheric pressure, respectively, for the month of January, and the other two the same phenomena for July. These are reproductions of some of the fifty-two maps annexed to the report.

One important fact that the "Challenger" observations revealed is, that the daily variation of the temperature on the surface of the ocean away from land is very small, nowhere exceeding a degree between latitudes 40° north and 40° south, and falling to one-fifth of a degree in the high latitudes. The temperature of the air was found to have a range about three to four times as great as that of the water below. In the Southern Ocean, at latitude 63°, it was 0.8 of a degree, or four times as great as that of the sea in the same region. Over the open sea the humidity curve closely follows that of the temperature, falling to a minimum at four o'clock in the morning and rising to a maximum at two in the afternoon; but near land a second minimum occurs from about 10 A.M. to 2 P.M. At this time, the land being heated, a current rushes in from the sea to take the place of the hot air that rises from it, and dry air from the upper regions of the atmosphere descends over the ocean. Over the open sea the barometer, though removed from the disturbing influence of land, shows as marked oscillations as over land where the diurnal variation of temperature is great. The cause must be sought in the daily changes in the temperature and humidity of the air produced through all its height by solar and terrestrial radiation.

Another important fact is that, latitude for latitude, the amplitude of the barometric oscillations is larger in an atmosphere highly charged with aqueous vapor than in a dry one. In the anticyclonic regions of the Atlantic and Pacific, the barometer falls only about 0.025 inches from the morning maximum to the afternoon minimum. Since pressure remains high, though currents of air are constantly flowing out from these regions in all directions over the surface of the ocean, it follows that the dry air from above must descend into their centres. These anticyclonic regions play a most important part in regulating the climates of the neighboring continents. The four principal lie in the Atlantic and Pacific, at about latitudes 36° north and south, and appear in all the monthly charts, with the exception of the North Atlantic region, which is absent in the month of January only. The absolutely highest mean pressure for any month, about 30.5 inches, is to be found in central Asia in the month of January. Here, to the south of Lake Baikal, is the centre of a great anticyclone, covering a large part of Eurasia, from which south and south-west winds blow over Russia and western Siberia, raising the temperature of these countries. Their effect may be seen on the temperature chart, on which the isothermals run nearly north and south.

Another example of the effect of pressure on climate may be taken from the low-pressure system in the North Atlantic, where the lowest mean pressure of 29.5 inches occurs between Iceland and the south of Greenland. This system gives rise in winter to south westerly winds in western Europe, and north-westerly winds over North America. While, therefore, the temperature of the former is abnormally raised by winds from lower latitudes, that of the latter is lowered by cold breezes from the Arctic regions. Hence, the temperature of the coast of Labrador is only — 13°, while on the same parallel in Mid-Atlantic it is 45°, or 58° higher.

The influence of other cyclonic and anticyclonic areas is discussed in Dr. Buchan's article. In reference to the drawing of isobars, the author gives a warning against the use of observations in steep and confined valleys, where descending cold currents at night and ascending warm currents in the afternoon unduly raise and depress the barometer alternately. Thus, in the Valley of Tönset, in Norway, the mean is 29.95 inches, while at Dovrè, situated at about the same elevation but separated from Tönset by a broad range of mountains, it is 29,87 inches.

Lastly, a few figures must be quoted regarding the velocity of the wind. This the "Challenger" observations showed to be greater over the open sea than near land, the mean difference being from four to five miles per hour. It is greatest over the Southern Ocean (23 miles per hour) and least over the North Pacific (15 miles). The curves on the open sea show a very slight diurnal variation, but near land they exhibit a distinct minimum between 2 and 4 A.M., and a maximum from noon to 4 P.M. The difference between the velocities on sea and land is greatest at 4 A.M., and gradually falls to a minimum at 2 P.M., demonstrating the effect of the land in reducing the velocity by friction, and the fact that this effect is, in some way or other, partially counteracted by the heating of the surface of the land. Such are a few of the important results pointed out in Dr. Buchan's paper, which is so full of valuable information that no abstract can do it justice.

[1] From the Scottish Geographical Magazine for July.

THE NEW LAKE IN THE COLORADO DESERT.

SPEAKING of the lake recently formed in the Colorado desert, in the southern part of California, by the overflow of the Colorado River, Major J. W. Powell, director of the United States Geological Survey, recently gave a reporter of the New York *Times* some interesting facts.

"The traditions of the Indians are by no means the only evidence that this basin has heen filled, wholly or partially, before," said Major Powell. "Since the delta was formed, and that portion of the Gulf of California was cut off and left to evaporate under the terrific heat of the sun, the Colorado has been playing pranks of this sort on several occasions. Along the hills which form the sides of this basin there are shoremarks which indicate that at different times the basin has been flooded to different heights, and then, when the river cut back through its old channel, evaporatian has again changed the lake to a parched desert. Along these shore-lines shells have been found which confirm this theory. The action of the Colorado in cutting new mouths for itself and then stopping them up is comparatively rapid because of the quantity of silt which the stream carries. It is not unlikely that the supposed traditions of the Indians are facts within the memory of some of the older ones of the scattering bands that live on the hillsides along the basin, for indications are that the valley has been inundated within fifty years, and certainly it has been at least once or twice since this continent was discovered.

"There is no immediate danger of the basin being filled, because it requires a large volume of water to fill it to the river level, and the evaporation is something wonderful. At the present time, according to reports, only a fraction of the water in the Colorado is flowing through this new outlet. It is possible that the channel may be enlarged as the stream continues to flow through it, so that all the water in the river will pour into the basin. Even if that were to happen the evaporation is great

enough to take up fully one-half of the Colorado as it spreads over the basin, and it would probably require from two to three years for the balance to fill the hole up to level. At such times as the river filled the basin to its level the flow to the Gulf of California has been through a channel which begins at the lower end of the basin, and makes a short cut directly south to the salt water. This is called Hardy's Colorado, and it is usually simply a dry channel or ditch. It may have been formed under circumstances similar to those existing at present. It is large enough to accommodate the entire volume of the Colorado after the evaporation which is sure to take place while the water is spread over the basin.

"Some idea of the terrible heat may be had from the evaporation which takes place. If the basin were filled to the river level, the lake would present a surface of about 1,600 square miles. This would be lowered at the rate of six feet a year by evaporation. The salt which is now being mined at Salton was deposited in the valley by the previous evaporations. The original salt deposit from the water which was a part of the Gulf of California is not responsible for all that is found there. The waters of the Colorado are saline, for the river flows through beds of rock salt at places many miles up from its mouth, and the successive deposits from the waters of this river as they have flooded the valley and then dried up have added largely to the original deposit."

OXFORD SUMMER MEETING OF UNIVERSITY EXTENSION STUDENTS.[1]

THE process by which university extension is carried throughout the country and made a vehicle for the further education of the adult student is well known, and is gradually becoming more and more appreciated in proportion as those who are responsible for the method improve the lines on which it is carried out. The machinery employed embraces lectures, classes, travelling libraries, etc., but one element vitally necessary to the university student is not supplied by these aids. This element is that of residence, and it was a happy suggestion on the part of the originators to propose that, for one month in the long vacation, arrangements should be made by which those who have profited by being brought into contact with a university lecture should enjoy the additional advantage of being brought under the charm that haunts the colleges and cloisters of Oxford and Cambridge.

The Oxford summer meeting commences on July 31, and is continued throughout the month of August; but, for the benefit of students who are unable to be present during so long a period, the course is divided into two sections, the second commencing on August 12. It has been found desirable to remove as far as possible the fragmentary and isolated character of the lectures given at these meetings, and therefore, while the course will be complete and independent in itself, it will also form the first part of a cycle of study which for its full development will embrace a period of four summers.

That these lectures propose something more than to add piquancy to an agreeable picnic will be shown from the following slight sketch of the subjects treated — and treated by authorities of acknowledged reputation. To take the lectures on natural science first: in physiology, Mr. Poulton will discuss the recent criticisms of Weismann's theory of heredity, and Mr. Gotch will lecture on the functions of the heart. In chemistry, Professor Odling lectures on the benzine ring, and under the supervision of Mr. Marsh a course of practical chemistry will be conducted in the laboratory of the University Museum. In geology, a course of practical instruction will be given by Professor Green and Mr. Badger, to include excursions in the neighborhood of Oxford. A class in practical astronomy will be welcomed at the university observatory; while electricity finds an able exponent in Mr. G. J. Burch. But the distinguishing feature of this meeting is the attention given to agricultural science "designed for agricultural audiences under county council schemes." This designation seems somewhat vague, and it will be very interesting to see the character of the audience attracted by this title. Four lectures are offered: the first entitled, "The Application of Science to the Art of Agriculture." This description is sufficiently wide, but does not indicate whether the lecture is intended as a sample of those which state-aided board schools in agricultural districts might well offer to lads who have passed through the successive standards, or as one addressed to the sons of farmers, and supplying that form of instruction which it is the duty of agricultural colleges to impart. Another lecture is offered on the management of poultry. This is more definite and more hopeful; and when we remember that the students who come up for these summer meetings are, for the most part, ladies, who can well be supposed to take an intelligent interest in this part of farming operations, we must admit that the subject is well chosen. Manures of various characters form the subject of the other two lectures, and will be doubtless of a sufficiently technical character.

The literature and history lectures are of special interest, and by the combination of many lecturers are made to cover with great completeness the mediæval period. Mr. Frederic Harrison gives, as an inaugural lecture, a survey of the thirteenth contury, and strikes the keynote of this section; while in the entire course, which embraces some sixty lectures, we meet the names of Professor Dicey, of Mr. York Powell, of Mr. Boas, and a host of others, affording alike a sufficient guarantee for the excellence of the work, and a happy augury for the success of the meeting.

[1] Nature, July 16.

THE FORESTS OF ZULULAND.

AN interesting and valuable report on the forests of Zululand, by Colonel Cardew, has been issued by the British Colonial Office as an official paper. Colonel Cardew's report, an abstract of which we find in the Proceedings of the Royal Geographical Society for July, deals in the first place with the existing state of the forests of Zululand, then with the measures necessary to preserve them, and lastly with the establishment of a staff necessary for the enforcement of the laws and regulations required to effect the better preservation of these forests. As to their general distribution, the forests of Zululand, Colonel Cardew says, may be conveniently divided in the same manner as has been done by Mr. Fourcade, assistant conservator of forests, in his report on the Natal forests; that is to say, into high timber forests, thorn bush, and coast forests. The high timber forests are situated on the Nkandhla and Qudeni ranges of mountains in the Nkandhla district; on the Entumeni and Eshowe Hills and the Ungoye Mountains, in the Eshowe district; on the slopes of the Ceza, and on the Useme, Empembeni, Makowe, and other hills in the Ndwandwe district; and on the VBombo Mountains, in the district of that name. The thorn bush is to be found to a greater or less extent in all the river valleys of Zululand, the timber increasing in size and the bush in density on the lower parts of the rivers, especially in those of the Umkusi, and White and Black Umfolosi. It is very large and dense in the country west of St. Lucia Lake.

The coast forests are of no great extent, with the exception of the Dukuduku; they grow in small patches along the streams and rivers near the coast, and especially at their mouths, and also cover the low sand-hills which border the coasts of Zululand. The Dukuduku is situated on the north side of the lower Umfolosi River in the district of that name. It is several miles in extent and very dense, and was the place of retreat of the coast chiefs during the disturbances of 1888. Dealing more particularly with the distribution of the high timber forests, Colonel Cordew states that the Qudeni forests clothe the slopes and spurs of the Qudeni Mountain, a magnificent range rising to an altitude of some 4,500 to 5,000 feet, and situated between the Tugela and Insuzi Rivers. The forests are of great extent. In the absence of a survey it is impossible to say what area they cover, but they clothe the southern, eastern, and northern slopes of the mountain, and from their extent and vastness are most imposing in appearance. They are certainly the finest forests in Zululand, and are composed of the most valuable timber, of the same nature and variety as that of the high timber forests of Natal. Yellow wood, both onteniqua and upright, abounds, and there is also every description of hard wood, but from want of adequate protection these noble forests have in many parts been ruthlessly destroyed. Woodcutters do